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METHOD FOR PRODUCING A DRY CONCENTRATE OF AN UNSATURATED FATTY ACID

[Verfahren zur Herstellung von ungesaettigtem Fettsaeure-Trockenkonzentrat]

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METHOD FOR PRODUCING A DRY CONCENTRATE OF AN UNSATURATED FATTY ACID

The invention concerns a method for producing an unsaturated fatty acid dry concentrate as well as a compound comprising at least one unsaturated fatty acid, and foods, beverages and medications that comprise the compound.

Fatty acids (alkenoic acids) are components of lipids, phosphoglycerides, glycolipids, cholesterol esterases and waxes. They consist of a long, generally unbranched hydrocarbon chain and a terminal carboxyl group. The chain is either saturated or contains one or several non-conjugated cis double bonds; the latter are characterized as fatty acids. The cytochrome-b_5-ADPH-dependent oxygenase system is missing in superior animals, for which reason linoleic and linolenic acid belong to the essential fatty acids for these, that is, their need must be covered with the food intake.

Up until a few years ago, linoleic acid (omega 6 fatty acid; C 18:2 (9,12)) in dietetic foods was considered as the general value-determining factor for supplying unsaturated fatty acids; according to new scientific discoveries, the biological and

[1] Numbers in the margin indicate pagination in the foreign text.

essential importance of further unsaturated fatty acids has become the center point of attention, for example, linolenic acid, stearidonic acid, oleic acid, erucic acid, nervonic acid, palmitoleic acid, and vaccenic acid. These (highly) unsaturated fatty acids are very important in biological and clinical nutrition medicine, especially for the prostaglandin (also inflammatory) metabolism, the heart and vascular system, the carbohydrate metabolism (diabetes), obesity, for the skin metabolism (neurodermatitis, psoriasis), the hormonal metabolism, for the performance of the central nervous system, the lungs (asthma), the joints (arthritis), the immune system (allergies, cancer, AIDS), autoimmune disorders, degenerative diseases of the joints, growth processes of children and adolescents, metabolism of athletes and heavy workers, and ageing processes. For an optimal health is accordingly necessary a sufficient and balanced supply of (highly)

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unsaturated fatty acids.

Unsaturated fatty acids occur in different concentrations mainly in natural plant oils, in which they have a consistent oily characteristic. A few of these oils, in particular hemp oil, linseed oil and fish oil, have in addition a strong penetrating

intrinsic odor and flavor, which considerably limits a broad use of these oils, despite their high health promoting value.

A further problem in connection with foods enriched with unsaturated fatty acids is that the natural oils, which are consequently rich in unsaturated fatty acids, have a very limited shelf life and their oily consistency considerably limits their usefulness. In order to circumvent these mentioned disadvantages and produce products enriched with unsaturated fatty acids, which also find broad acceptance among the consumers, these oils are processed by means of technically complicated processes. Because of the strict production conditions required for this processing, however, the unsaturated fatty acids are modified to such an extent that they lose their high health promoting value. The processing of the mentioned oils into medicines, such as capsules, tablets, or liquids, in turn also satisfies only partially the daily requirement doses of physiological nutrition, which are within the gram range, precisely because of the dose volumina, which is limited by the described medicament forms.

In WO 87/03899 is described a process for the production of an omega 3 concentrate, in which the fatty acid fraction of fish oil is esterified at ambient temperature. In addition, after a heating to between 50 and 90°C and a subsequent cooling to 0°C,

the alkyl ester is precipitated and separated. An additional purification by extraction with a solvent produces the desired product. This process has several steps, however, in which the unsaturated fatty acids are subjected to relatively demanding conditions (great temperature fluctuations, different solvents and buffers, et cetera), so that part of the unsaturated fatty acids are modified or lost.

United States patent 6,030,645 concerns dry particles,

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comprising a oleophilic active substance, which is dispersed in a carrier material, in which the particles are coated with a compound containing calcium silicate. The oleophilic substance is, for example, arachidonic acid, carotenoids, et cetera. As carrier material is disclosed, inter alia, cellulose, maltodextrin, alginate, lactate, rubber, gelatin, sugar, sugar alcohol and starch. These particles are produced by mixing the oleophilic substance with the carrier material, and spraying this mixture into the calcium silicate, so that the oleophilic particles that are produced by the spraying are coated with calcium silicate. The particles are subsequently dried.

According to JP 6181725 A, a compound, comprising an easily oxidizable oily substance is introduced into a porous carrier by

means of a reduction of the pressure in such a way that the compound displaces the air in this porous carrier.

FR 2 758 055 A1 concerns a powdery substance, comprising oil based on unsaturated fatty acids, and an absorbent agent, possibly starch. The oil and the absorbing agent are homogenized and sprayed in order to obtain microparticles, whereupon the water contained in these microparticles is evaporated.

In United States patent 5,106,639 A is described a process for producing food supplements in which a carrier, an emulsifier, and an oil, comprising omega 3 fatty acids, are mixed and then dried to a powder. The carrier can be, for example, soybean protein, starch, pectin, gelatin, collagen, casein, and the like.

EP 0 424 578 A1 concerns a dry mixture, comprising an oil with unsaturated fatty acids and caseinate, in which these two substances are mutually mixed, whereupon the compound is dried.

In DE 4 411 414 C1 is described a product for enteral delivery with fatty acids and/or amino acids, as well as a process for producing this product, in which the fatty acids are embedded in the amylase helix by means of a joint extrusion with starch, so that inclusion complexes are formed. The compound is then dried.

United States patent 4,559,222 A concerns a compound, comprising a medicament, in which this compound comprises also mineral oil and silicon dioxide.

The above-described processes have, however, the disadvantage that high-quality oils with high proportions of unsaturated fatty acids cannot be treated with sufficient care, so that an excessively high quantity of unsaturated fatty acids is lost during the course of the process.

It is an object of the invention to make available a process for producing a concentrate from unsaturated fatty acids, in which the above-mentioned disadvantages are circumvented, and in which however the high health promoting value of the unsaturated fatty acids can be maintained. By means of such a concentrate should be made available doses with a sufficient quantity of unsaturated fatty acids, which do not have an excessively large volume. The process should ensure a fine surface distribution of oil particles and an exact dosage of the quantity ratios of fatty acids and carrier matrix.

The process according to the invention of the kind described above is characterized in that a substance comprising at least one unsaturated fatty acid is applied on a biologically inert matrix with a large surface and then dried. Under "substance"

is understood within the scope of the invention, an oil, preferably an untreated oil, as well as also any other compound comprising at least one unsaturated fatty acid. Through the application of the substance on a biologically inert matrix with large surface is attained that the substance is distributed over as small a volume as possible. In this way, it is possible to dry the substance rapidly and under mild conditions and to make it available in high concentrations in a form that remains stable during storage. It is important therein that the matrix is biologically inert and that the unsaturated fatty acid(s) are thus not attacked or modified by it. The unsaturated fatty acids adhere to the matrix, whereby they (1) are easy to handle and (2) the matrix offers a specific protection against other

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substances that may attack the unsaturated fatty acids. For a good distribution and sufficient drying of the unsaturated fatty acids, it is important that the biologically inert matrix has a large surface, that is, a surface of 50-1000 m^2/g.
Under matrix with a "large surface" is understood within the scope of the invention a carrier that is highly dispersible. Through the application, possibly by spraying, of the fatty acids on the highly disperse matrix, fine fatty acid droplets accumulate on the finely distributed matrix particles. In this

way is ensured an optimal fine surface distribution of the fatty acid particles as well as an exact dosage of the quantity ratios of fatty acids to carrier matrix. In this way, it is possible for the first time to concentrate and dry the temperature and oxygen sensitive fatty acids in a mild manner and without losses or without significant losses. In contrast to the porous carrier materials of the state of the art, the highly dispersible matrix allows a dry, highly concentrated fatty acid product to be obtained. In this way, high-quality oils, possibly high-quality plant oils with large proportions of thermally unstable and oxygen sensitive fatty acids, are joined with the matrix and dried at a mild temperature.

The matrix has preferably an average surface of at least 100 m^2/g, especially preferably at least 150 m^2/g, and even more especially preferably at least 200 m^2/g, and most preferably at least 400 m^2/g.

The average particles size of the matrix amounts, for example, to a maximum of about 900 nm, preferably a maximum of 500 nm, particularly preferably a maximum of 250 nm, a maximum of 100 nm, a maximum of 50 nm, a maximum of 25 nm, and most preferably a maximum of 15 nm.

The combination of the unsaturated fatty acids on the biologically inert matrix and the additional drying ensures that

a dry concentrate with unsaturated fatty acids without oily consistency and penetrating intrinsic odor and flavor is made available. A considerably improved shelf life is also provided. In addition, the production process can also be carried out

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rapidly and economically. Finally, the compounds according to the invention can be easily and simply further processed by the food industry.

A further advantage consists in that practically no loss of unsaturated fatty acids occurs as with the conventional processes, for example, extraction processes.

It is particularly advantageous if the substance is applied by means of nozzles on the matrix. In this way, it is ensured that the substance is finely distributed over the matrix already before applying the substance on the matrix and in this way a uniform fine distribution of the matrix is ensured.

For a thorough mixing, it is advantageous if the matrix and fatty acid mixture is mixed in a mixing system, in particular by means of a mixing screw conveyor. Any of the mixing systems (with mixing screw conveyor) known from the state of the art, in which the mixing container can be fully sealed, can be used. It is advantageous if in addition vibrators are also mounted on the container wall, which improves the mixing of difficult to mix

raw materials. The mixing accuracy can be further improved by means of a tilting and swaying motion of the mixing container. The mixture is refined by means of shaving heads and tubers and agglomerations that could form in the mixing mass are reduced to small pieces. It is advantageous if parameters, such as the mixing time, injection time, injection pressure, tilting angle, vibrators, and shaving head connection can be programmable or adjustable. In this way, it is easily possible for the person skilled in the art within the food industry sector to optimize the process for all substances and surfaces. An example of a suitable mixing system is the batch mixer "Prodima AC-LI/500." For a uniform mild and still fast drying, it is advantageous if the matrix and fatty acid mixture is dried in a vacuum. This vacuum drying is generally known to the persons skilled in the art. During vacuum drying, the mixture can be constantly mixed, for example, in a boiler, by means of an agitator. The vapor produced by means of the vacuum drying can be condensed and

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discharged into a water container. The boiler is preferably rotatable and reclined and can have any size, for example, 500 to 1000 liters. The system is preferably temperature or pressure controlled.

A particularly advantageous drying is characterized in that the matrix is dried at 1-50 mbar, especially at 10-30 mbar. In this vacuum is ensured a gentle drying without temperature damage. It is particularly advantageous if the matrix and fatty acid mixture is dried at 10 to 50°C, in particular at 30 to 36°C. In this working area occurs no damage of the unsaturated fatty acids. The boiler is heated, for example, by means of a control to a constant temperature. For this purpose, the drum can be provided with a double shell for hot water, which is heated via the heat recovered from the cooling device. A continuous flow water heater can also be incorporated in order to produce additional heat.

The substance is preferably applied on a silicon matrix, for example, a SiO_2 matrix. This matrix is biologically absolutely inert and has furthermore a sufficiently large surface, in order to make available a matrix that is advantageous for the process. It is especially advantageous if the substance is applied on a highly dispersed silicon dioxide matrix. This matrix is particularly well suited for the application of unsaturated fatty acids and subsequent drying.

The matrix is produced, for example, from Aerosil®, a highly disperse silicic acid with more than 99.8% SiO_2 content. This matrix is composed of amorphous sphere-shaped particles, which

have a diameter of about 10 to 20 nm. With a volume of approx. 15 ml, 1 g of Aerosil® has a surface of 100 to 400 m^2. This matrix is particularly well suited for the process according to the invention.

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A particularly advantageous process is characterized in that linseed oil, safflower oil, borage oil, hemp oil, soybean oil, pumpkinseed oil, sunflower oil, sesame oil, evening primrose oil and/or fish oil are applied as substance on the matrix. These oils comprise different concentrations of (highly) unsaturated fatty acids (see Tables 1 to 3). If these plant oils are applied in natural state on the matrix, they have an extremely high health promoting value with reference to their content of unsaturated fatty acids. The process is also carried out rapidly and economically.

A substance comprising (highly) unsaturated fatty acids, in particular omega 3, omega 6, omega 7, and/or omega 9 fatty acids is preferably applied on the matrix. Either single purified fatty acids can be used or also a mixture of two or more of these fatty acids. Plant oil comprising these fatty acids can also be used.

A particularly advantageous process is characterized in that 1 to 3, in particular 1.5, weight parts of substance for each

weight part of matrix are applied on the matrix. In this way is attained an ideal ratio of unsaturated fatty acids with respect to the matrix, so that a maximum quantity of fatty acids is applied on the necessary amount of matrix that is necessary for it, and the largest possible surface is obtained for the smallest possible volume of fatty acid dry concentrate.

In order to obtain the most durable product possible, it is advantageous if at least one stabilizer, in particular an antioxidant, is added to the matrix and fatty acid mixture. D,L-alpha tocopherol and ascorbyl palmitate are particularly suitable as highly unsaturated fatty acids. In this way, the shelf life of the dry concentrate is increased and the stability, in particular with regard to further processing, is improved.

It is also particularly preferred if at least one aromatic and/or flavor correcting substance is added to the matrix and fatty acid mixture. In this way, any possibly remaining unpleasant odor or flavor of the unsaturated fatty acids is

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stopped. Under odor or flavor correcting substance is understood within the scope of the invention not only a concealment of the odor or flavor, but also the addition of a

pleasant odor or flavor, for example, a sweetener, a fruity flavor, etheric oils, et cetera.

It is particularly advantageous if ethereal lemon oil is used as odor or flavor correcting substance. This substance is particularly well suited as additive for unsaturated fatty acids.

A further advantageous process is characterized in that milk, in particular pasteurized milk, is added to the matrix and fatty acid mixture before drying. Any type of milk can be added, in particular cow's, mare's, donkey's, colostral, goat's and/or sheep's milk. Dry concentrates of the mentioned milk species or fractions of these have, inter alia, immunostimulating effects on the human and animal organism. The content of these essential nutrients in milk concentrates according to need is increased by adding (highly) unsaturated fatty acids and the biological value of milk concentrates is improved in this way. 1 to 2, preferably approximately 1.5, weight parts of milk are added for each weight part of matrix and fatty acid mixture. This quantity ratio has shown to be particularly advantageous, so that the advantages of the addition to the milk are attained without disturbing the further drying process or cause negative effects on the unsaturated fatty acids.

For the ingestion of these concentrates, it is particularly advantageous if the matrix and fatty acid mixture is processed after drying, in particular to powder, capsules, tablets, or liquids. Further additives can also be added, possibly vitamins, flavor additives, mineral substances, medicaments, et cetera. The necessary daily dose of fatty acids, for example, can also be processed to form a unit, such as tablets or capsules.

It is particularly preferred if the matrix and fatty acid mixture is added to foods and/or beverages after drying, in

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particular baby food, milk products and/or baking mixes. Since the fatty acid dry concentrate does not have an oily consistency and does not have an unpleasant odor or flavor, the food or beverage is not fundamentally changed by this addition, so that none or hardly any additional process steps are necessary.

A further aspect of the invention concerns a compound comprising at least one unsaturated fatty acid and a matrix with large surface. With regard to the unsaturated fatty acid and the matrix applies in turn what was mentioned above, so that the compound is preferably a concentrate of at least one unsaturated fatty acid. This compound can have any imaginable consistency, but should preferably be made available as dry concentrate. The

compound surprisingly does not have an oily consistency caused by the combination of the unsaturated fatty acid and the matrix with large surface as is the rule usually in the prevalent products comprising unsaturated fatty acids. This compound does also not have the otherwise occurring penetrating intrinsic odor and flavor, and is, in particular as dry concentrate, considerably longer lasting.

The matrix is preferably a silicon matrix, for example, a SiO_2 matrix, in particular a highly dispersed silicon dioxide matrix. This matrix is particularly well suited as inert basic substance for a compound comprising an essential fatty acid, has a large surface, and is very well suited for any further processing.

The compound comprises preferably linseed oil, safflower oil, borage oil, hemp oil, soybean oil, pumpkinseed oil, sunflower oil, sesame oil, evening primrose oil and/or fish oil. These oils have a high content of (highly) unsaturated fatty acids and in particular a high health promoting value in natural state.

It is particularly advantageous if the compound comprises at least one highly unsaturated fatty acid, in particular omega 3, omega 6, omega 7, and/or omega 9 fatty acids. These essential fatty acids are particularly important for numerous biochemical

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processes and also for the structure of substances that are of vital importance.

The compound comprises advantageously 0.1 to 3 weight parts of the at least one unsaturated fatty acid for each weight part of matrix. Naturally, in case natural oil is utilized for the production of the compound, the concentration and also the type of unsaturated fatty acid can vary more or less strongly. This ratio, which naturally also depends from the respective further processing, is however optional as a rule.

The compound preferably comprises at least one stabilizer, in particular an antioxidant, at least one odor and/or flavor correcting substance, in particular ethereal lemon oil, and/or dry milk, in particular pasteurized milk. These additives optimize the properties of the compound, simplify their further processing, and have a particularly advantageous effect on the final product, for example, with regard to the shelf life or flavor.

A particularly advantageous compound is characterized in that it comprises 1 to 2, in particular 1.5, weight parts of milk for each weight of matrix and fatty acid mixture. In this way is achieved an optimal consistency.

For a good shelf life and simple further processing, it is preferred that if compound is dried. Particularly preferred are compounds having an A_w value of 0.8.

A further aspect of the invention is to make available a food, a beverage, or a medicament that is characterized in that it is mixed with the compound according to the invention in the manner described above. The food or beverage can be any commercially available product, for example, a basic food or a luxury food item. The consistency of the food is not essential, it can be either fluid, such as, for example, a fruit juice, viscous, such as yoghurt, marmalade, oil, et cetera, or solid, such as a

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baking mix, cereal, or the like. The compound can, of course, also be made available in highly concentrated form as an effervescent tablet, syrup or the like. Also the medicament, which comprises the compound according to the invention, can have any kind of imaginable form and consistency, for example, the form of a tablet, liquid, powder or capsule.

The process according to the invention will now be explained based on the following example, which however does not represent a limitation.

Example:

In a mixer of the Prodima "Batch Mixer Prodima AC-LT/500," brand, in which a highly dispersed silicon dioxide is placed, the following components are injected under steady stirring via fine nozzles into the spraying system:

- Linseed oil: 2 weight parts (see Table 1)
- Safflower oil: 1 weight part (see Table 2)
- Borage oil: 1 weight part (see Table 3)
- D,L-alpha tocopherol and ascorbyl palmitate as stabilizers
- Odor and flavor correcting substances (ethereal lemon oil)

Table 1: Linseed Oil (g of fatty acids/100 g of fat)

Palmitic acid	5.95
Stearic acid	3.60
Oleic acid	18.20
Linoleic acid	13.90
Linolenic acid	54.20

Table 2: Safflower Oil - Fatty acid compound % (subject to fluctuations)

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C14:0	0.1 - 0.2
C14:1	0
C16:0	6.7 - 7.7

C16:1	0
C18:0	2.4 - 2.7
C18:1	12.6 - 13.6
C18:2	75.7 - 77.1
C18:3	0 - 0.2
C20:0	0.3 - 0.4
C20:1	0 - 0.2
C22:0	0 - 0.2
C22:1	0
C24:0	0

Table 3: Borage Oil

Acid value (mg KOH/g oil)	0.1 %
Gamma linolenic acid content	23.6%

The silicon dioxide placed in the mixing system has a ratio of 2.7 weight parts. The EFS powder obtained in this way (EFS = Essential Fatty Acids) has a total content of 48.3% of essential fatty acids with the following distribution pattern:

Table 4:

W-3 Fatty Acids:	
C 18:3 (9, 12, 15) alpha linolenic acid	10.5%
C 18:4 (4, 8, 12, 15) stearidonic acid	0.01%

W-6 Fatty Acids:	
C 18:2 (9, 12) linoleic acid	16.8%
C 18:3 (6, 9, 12) gamma linolenic acid	2.5%
W-9 Fatty Acids:	
C 18:1 (9) Oleic acid	7.8%
C 22:1 (13) Erucic acid	0.3%
C 24:1 (15) Nervonic acid	0.12%

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W-7 Fatty Acids:	
C 16:1 (9) Palmitoleic acid	0.02%
C 18:1 (11) Vaccenic acid	0.05%

In a "mare's milk system" evaporating apparatus were placed approximately 41 kg of EFS concentrate. Approximately 57 kg of pasteurized milk (optionally cow's, mare's, donkey's, colostral, goat's, or sheep's milk) are then added and evaporated for 24 hours at a temperature of 32°C under vacuum conditions (approx. 10 mbar). After 24 hours, the aqueous portion of the added milk is evaporated at a mild temperature. The residue obtained by

means of this process was a milk-EFS concentrate with a high proportion of (highly) unsaturated fatty acids in stable, organoleptically acceptable, and highly concentrated powder form. This powder form can be further processed to different products (baking mixes, baby food, milk products) and also in different medicament forms, such as capsules, tablets, et cetera.

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Patent Claims:

1. A process for producing an unsaturated fatty acid dry concentrate, wherein a substance comprising at least one unsaturated fatty acid is applied on a biologically inert matrix with a large surface and then dried.

2. The process of claim 1, wherein the substance is applied by means of nozzles on the matrix.

3. The process of claim 1 or 2, wherein the matrix and fatty acid mixture is mixed in a mixing system, in particular by means of a mixing screw conveyor.

4. The process of claim 3, wherein the matrix and fatty acid mixture is vacuum dried.

5. The process of claim 4, wherein the matrix and fatty acid mixture is dried at 1-50 mbar, especially at 10-30 mbar.

6. The process of claim 4 or 5, wherein the matrix and fatty acid mixture is dried at 10 to 50°C, especially at 30 to 36°C.

7. The process of claims 1 to 6, wherein the substance is applied on a silicon matrix.

8. The process of claim 7, wherein the substance is applied on a highly dispersed silicon dioxide matrix.

9. The process of one of the claims 1 to 8, wherein linseed oil, safflower oil, borage oil, hemp oil, soybean oil, pumpkinseed oil, sunflower oil, sesame oil, evening primrose oil and/or fish oil are applied as substance on the matrix.

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10. The process of one of the claims 1 to 9, wherein a substance comprising highly unsaturated fatty acids, in particular omega 3, omega 6, omega 7, and/or omega 9 fatty acids, is applied on the matrix.

11. The process of claims 1 to 10, wherein 1 to 3, in particular 1.5, weight parts of substance are applied on the matrix for each weight part of matrix.

12. The process of one of the claims 1 to 11, wherein at least one stabilizer, in particular an antioxidant, is also added to the matrix and fatty acid mixture..

13. The process of one of the claims 1 to 12, wherein at least one odor and/or flavor correcting substance is added to the matrix and fatty acid mixture.

14. The process of claim 13, wherein ethereal lemon oil is added as odor and flavor correcting substance to the matrix and fatty acid mixture.

15. The process of one of the claims 1 to 14, wherein milk, in particular pasteurized milk, is added to the matrix and fatty acid mixture before drying.

16. The process of claim 15, wherein 1 to 3, especially approximately 1.5, weight parts of milk are added for each weight part of matrix and fatty acid mixture.

17. The process of one of the claims 1 to 16, wherein the matrix and fatty acid mixture is further processed after drying, in particular to a powder, capsules, tablets or liquids.

18. The process of one of the claims 1 to 17, wherein the matrix and fatty acid mixture is added after drying to foods and/or beverages, in particular to baby food, milk products, and/or baking mixes.

19. A compound comprising at least one unsaturated fatty acid

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and a matrix with a large surface.

20. The compound of claim 19, wherein the matrix is a silicon matrix.

21. The compound of claim 20, wherein the matrix is a highly dispersed silicon dioxide matrix.

22. The compound of one of claims 19 to 21, comprising linseed oil, safflower oil, borage oil, hemp oil, soybean oil, pumpkinseed oil, sunflower oil, sesame oil, evening primrose oil and/or fish oil.

23. The compound of one of the claims 19 to 22, comprising at least one highly unsaturated fatty acid, in particular omega 3, omega 6, omega 7, and/or omega 9 fatty acids.

24. The compound of one of the claims 19 to 23, comprising 0.1 to 3 weight parts of at least one unsaturated fatty acid for each weight part of matrix.

25. The compound of one of the claims 19 to 24, comprising at least one stabilizer, in particular an antioxidant.

26. The compound of one of the claims 19 to 25, comprising at least one odor and/or flavor correcting substance.

27. The compound of claim 26, comprising ethereal lemon oil as odor and flavor correcting substance.

28. The compound of one of the claims 19 to 27, comprising dry milk, in particular pasteurized milk.

29. The compound of claim 28, comprising 1 to 2, preferably approximately 1.5, weight parts of milk for each weight part of matrix and fatty acid mixture.

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30. The compound of one of the claims 19 to 29, wherein said compound is dried.

31. A food, which is mixed with a compound of one of the claims 19 to 30.

32. A beverage, which is mixed with a compound of one of the claims 19 to 30.

33. A medicament, which is mixed with a compound of one of the claims 19 to 30.